POPULAR MECHANICS

An Illustrated Weekly Review of Mechanical Press of the World

"Tells you how to do things." Written so you can understand it.

Smithsonian Institution

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Pier Built to Recover Long Lost Treasure

Million Dollars in Gold Sunk with Burning Ship Off Mexican Coast 41 Years Ago Discovered by Boston Man--See Page 294

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LIBRARY OF CONGRESS. MAY 7 1903

$1,200 a Year for Life

Secured by Small Monthly Payments

There is nothing speculative about crude rubber. It can be sold every day in the year, in every market in the world and at a stable price that has been steadily advancing for many years. For a quarter of a century the world's supply of crude rubber has always been spoken for months before it has reached a civilized market. It can be gathered every day in the year irrespective of weather or season. The ignorant and improvident natives who gather it today almost invariably "tap to death" the tree that brings them their golden harvest, and in the virgin jungle no white man can live to guide and oversee them. Hence, the price has doubled in ten years, and the question of the world's supply of rubber for the future becomes of vast moment.

We are changing the production of Crude Rubber from the primitive and destructive method heretofore employed to the most scientific and economic plan known to modern forestry. No industry ever underwent so radical a development as we are now engaged in without making immensely wealthy those who accomplish the change.

We have 6,175 acres of land in the state of Chiapas, the most fertile soil in Mexico, and we are developing this land into a commercial rubber orchard under the most successful conditions and plans known to scientific forestry. We are selling shares in this plantation, each representing an undivided interest equivalent to an acre of land.

Each acre as soon as it is sold, is cleared and planted to 600 rubber trees; 400 of these are tapped to death before maturity, leaving at the end of the development period 200 trees, the normal number per acre for permanent yield. The advantage of this method is that by beginning the tapping thus early, dividends begin also the same year.

Any one can own such shares, or acres, by paying for them in small monthly installments. Supposing you buy only five. You pay $20 a month for 12 months, then $10 a month for a limited period, until you have paid the full price of the shares in the present series—$276 each; but during the period of these payments you will have received dividends amounting to $210 per share; hence, the actual cost of your shares, or acres, is only $66 each, and you own real estate then worth at least $2,500, and from the maturity period onward, longer than you can live, your five acres, or shares, will yield you or your heirs a yearly income of $1,200. This is a most conservative estimate (based on Government reports of the United States and Great Britain, the most reliable sources of information in the world) for 200 trees per acre, and figuring them as yielding each only two pounds of crude rubber per year, a total of 400 pounds at 60 cents net per pound. Of course, if you buy 10 shares your income would be $2,400 yearly, or better still 25 shares will yield $6,000 a year.

Five Acres, or Shares, in our Rubber Orchard planted to 1,000 Rubber Trees will at maturity yield you a sure and certain income of $100 a month for more years than you can possibly live. Your dividends average 25 per cent, during the period of small monthly payments.

Every possible safeguard surrounds this investment. The State Street Trust Company of Boston holds the title of our property in Mexico as Trustee. We agree to deposit with them the money paid in for shares, and we file with them sworn statements as to the development of the property. This Company also acts as Registrar of our stock. You are fully protected against loss in case of lapse of payment or in case of death, and you are granted a suspension of payments for ninety days at any time you wish. Furthermore, we agree to loan you money on your shares.

RUBBER! Indispensable as wheat or cotton, or coal. American manufacturers alone consume annually sixty million pounds of crude rubber, worth at least forty million dollars. Yet the supply falls short of the demand. The immediate completion of the Pacific cable would consume the entire available supply of rubber in the United States today.

We can prove to you that five shares in this investment, paid for in small monthly installments, will bring you an average return of TWENTY-FIVE PER CENT. ON YOUR MONEY DURING THE PERIOD OF PAYMENT, and will then bring you $100 A MONTH FOR MORE THAN A LIFETIME. Send us $20 as the first monthly payment to secure 5 shares—$40 for 10 shares—$100 for 25 shares ($4 per share for as many shares as you wish to secure). This opens the door for yourself, not to wealth, but to what is far better, a competency for future years, when perhaps you will not be able to earn it. We already have hundreds of shareholders scattered through 40 states, who have investigated and invested. Our literature explains our plan fully and concisely, and proves every statement. It will be sent to you immediately, on request.

Mutual Rubber Production Co.

113 Milk Street, BOSTON, MASS.

Please mention Popular Mechanics when writing to advertisers.

Dedicating a World's Fair

100th Anniversary of the Louisiana Purchase, Celebrated with Pomp and Pageantry —Splendid Entrance to Liberal Arts Building Pleases Visitors

A salute of 100 guns announced to the world at noon, April 30, 1903, the close of the first century of an inland empire that Napoleon sold for a song. With pomp and pageantry was the occasion befittingly celebrated at St. Louis, the metropolis of the Louisiana domain. The celebration lasted three days, during which time every government represented at Washington had transferred its headquarters from the national capital to St. Louis. The United States military strength was displayed before these nation's representatives. The presence of the president of the United States, his cabinet, congress and the supreme court at the head of the armed column was symbolical of a government by the people and its achievements.

It was the event in which St. Louis made her debut in the civilized world.

The celebration was replete with speeches by the great men of the nation; magnificent displays of fireworks, balloon ascensions, the firing of aerial guns, parades, and revelry. The United States navy was represented by the monitor Arkansas, the largest war vessel that ever ascended the Mississippi river to St. Louis.

The entrance to the Liberal Art building, with the triumphal causeway leading to the exposition grounds, presented an imposing appearance. A broad asphaltum way extended past the finished front of five exposition buildings decorated with the flags of all nations. The president reviewed the parade from the grand stand in the court of monuments, the principal vista of the fair. The doors of the Liberal Arts building admitted 35,000 persons to be seated under the direction of the guards and ushers. In one of the pyrotechnic displays there was a reproduction in fire of the Cabildo, the building at New Orleans in which the actual transfer of the Louisiana territory was made by the agents of France to the agents of the United States.

Liberal Arts Building at the Completed Entrance of which the Dedicatory Services were Held

Rear Admiral Bowles urges the building of more slips in the New York navy yard. The yard is now so crowded that it will be unable to accommodate all the warships when the North Atlantic Squadron is in northern waters.

That Canada is not averse to American trade expansion in that country is demonstrated by the following from the Canadian Manufacturer: "The location of such immense concerns as the Canadian Otis Elevator Co., the Westinghouse Mfg. Co., and the Deering Harvester Co. at Hamilton, is certain to prove most profitable to the city."

Art Palace, to be the Most Beautiful Building at the Louisiana Purchase Exposition

Sunken Treasure Found After 40 Years

Million Dollar Cargo of Gold Bullion that Went Down with the "Golden Gate" in 1862, Discovered by a Boston Man

After many years of search and the spending of fortunes, the golden treasure that sank with the steamship "Golden Gate," which was burned off the coast of Manzanillo, Mexico, in 1862, has been discovered. Popular Mechanics has just received a full report of the remarkable find with a photograph showing the methods being pursued to recover the treasure, and hence is able to give its readers the first account of the discovery, which has been guarded with great secrecy.

It is through the efforts of C. W. Johnson, of Boston, that the million dollars in gold bullion and other sunken riches have at last been located. Buried deep under the sands off the stormed lashed coast of Manzanillo, the finding of the sunken hulk with its gold was but the beginning of the task. So fierce were the breakers and treacherous the sands that it was found impossible to carry on the work from vessels by means of diving. It was necessary to build a great wharf out to where the wreck was located, a task that was most difficult. From this wharf the work of dredging and pumping is now being arduously pursued. Already the treasure room of the sunken vessel, where the million dollars in gold bullion was stored, has been tapped and a large quantity of the gold has been brought to shore. Gold coins have also been found among the masses of wreckage brought to the surface. None of the recovered coin retains any of the original stamping of the mint. The wharf and locality where the wreck was found are shown in the front page illustration.

The "Golden Gate," on which the treasure was being transported 41 years ago, was on her way from San Francisco to Panama. She had on board a large number of passengers bound for New York. The bullion, amounting in itself to $1,000,000, was taken from the then rich mines of California. The ill-starred vessel which had just survived a terrific storm, caught fire when off the coast of Manzanillo. The steamer headed shoreward and was beached. Several lives were lost, but most of the passengers were rescued by the Mexican authorities. Nothing was saved except the clothing the survivors wore. The great pile of gold with other treasures were stored in one room about midship and this was one of the first spots to be surrounded by the flames. The ship burned to the water and sank. The hulk, covered by many fashoms of water, soon worked its way deep into the shifting sands, and expedition after expedition sent in search returned disappointed. The terrible breakers, they reported, made the work of searching most hazardous. From time to time other expeditions have since made the attempt with similar results. C. W. Johnson, a prominent Boston contractor, went to Manzanillo not long ago, and watching the breakers from the shore studied the probable drift of the sands and became convinced that he could locate the long lost vessel with its fortunes. He secured a vessel, with divers and proper equipment, and his efforts were early crowned with success. He kept the matter quiet, returned to Boston, figured out the best way to get to the hulk, interested other parties and after a methodical effort obtained the sole right to work for the lost treasure.

Cubans Lack Mechanical Genius

Ignorance Displayed in the Construction of their Vehicles and Farm Implements

Among the deficiencies of the Cuban might be mentioned his lack of mechanical knowledge. The vehicle herewith shown is one sample of this national ignorance. The vehicle is called a Volante and is very common in Santiago and Havana. The Cuban has never noticed that this construction of the rig almost doubles the burden on the horse. Instead of placing the weight of the load above the axles of the wheels it is between the horse and the wheels so that the animal besides having to pull the load has to assist the wheels in supporting it. The driver of the volante always rides the horse, which does not lighten the burden. It is to be hoped that the volante will disappear with the coming of the Americans.

An equal amount of ignorance of the laws of mechanics is exhibited by the Cubans in the construction of their railroads, brick yards, factories, all conveyances, farm implements, etc. Old practices in vogue nearly a century ago still obtain.

Tropical Truth says: It would be quite a joke for a farmer boy at home to see a Cuban farmer plow. The plow is the crooked limb of a tree and a single ox is the locomotive power. Nothing so primitive was thought to exist on the continent, but here it is.

A Cuban Volante

EARLIEST RACE IN AMERICA.

Scientists Find Trace of People Living in Peru Before Trojan War.

A cultured race, learned in the arts of peace and war, existed in Peru before the Trojan war, according to discoveries alleged to have recently been made by Dr. Max Uhle, director of anthropological excavations of the University of California. Heretofore Inca traditions led scientists to believe that Peruvian civilization existed only a few centuries before the coming of the Spaniards. The work of Dr. Uhle is said to have established the fact that a great civilization flourished 2,000 years earlier.

A coal company in San Francisco has installed electrical machinery and will make briquettes from coal dust.

Discoveries of extensive iron ore fields have been made in northern Norway.

Popular Mechanics is written so you can understand it.

Creosoting Makes Wood Everlasting

The Sea's Most Destructive Worm, and the Ravages of Time Defied by Improved Methods

Creosoting, now becoming an important industry in the United States, makes wood more lasting than iron. Soft sap timbers in one time considered almost useless for construction work, are rendered practically indestructible by this modern method of preserving. In fact, it has been found from tests that the more sap there is in the timber before being treated the better it will be preserved.

Herman Von Schrenck, the noted engineer, states: "Such timbers as can be wholly impregnated will never rot; they may wear out because of mechanical abrasion."

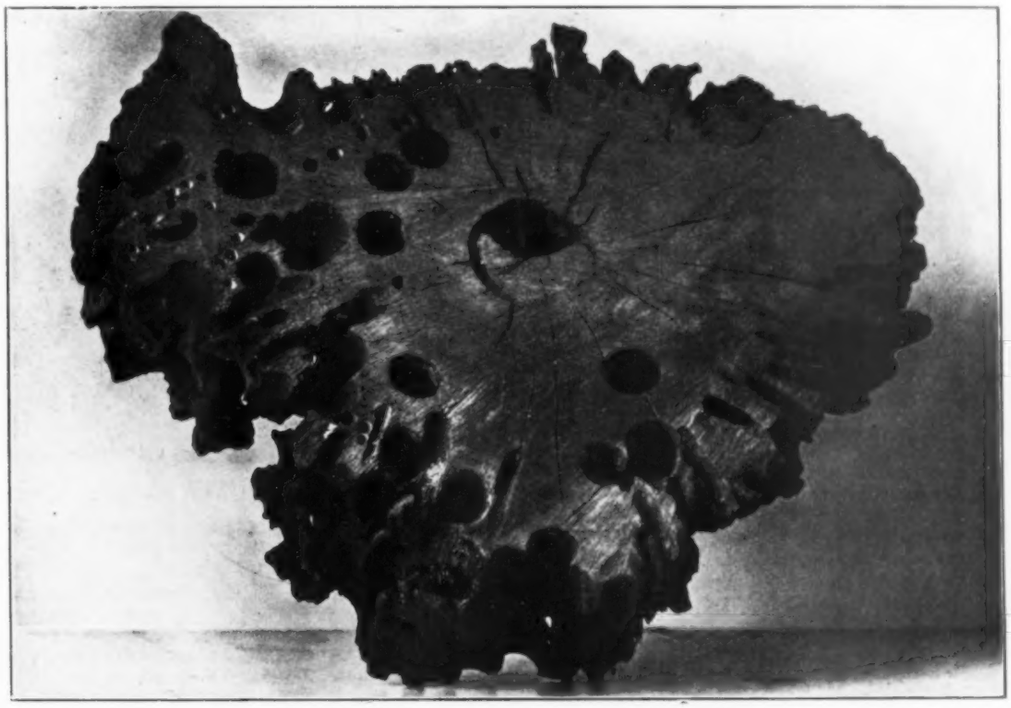
W. Langdon says: "A telegraph pole or a railway sleeper, free from disease, if properly seasoned and encased in such a manner as to prevent moisture getting into its fibre, is practically indestructible from rot or decay."

W. H. Preece quotes an authority who, as a result of 30 years' experience, had never seen a case of properly creosoted pole showing the slightest sign of decay.

Thus are great mechanical experts of Europe and America awakening to the wonderful possibilities of this method of preserving timbers. Even the dreaded marine worms, the teredo and the limnoria, which have heretofore worked such havoc on sea submerged timbers, destroying them in less than two years, are powerless to harm creosoted woods.

Creosoting consists in impregnating timber with creosote oil, more correctly "dead oil of coal tar." The old method, yet largely employed in Europe, was to force the heated creosote into the air-seasoned, or naturally seasoned timbers. The modern method, now universal in this country, is to season the timbers artificially, making the seasoning and creosoting practically one continuous operation. In the West Pascagoula Creosoting works, probably the largest in America, the timber is placed in a closed iron cylinder and steam is admitted until the required pressure is reached, and this pressure is kept until the sap is sufficiently liquefied, when the steam is allowed to escape and the air is exhausted as nearly as practicable with a vacuum pump, the temperature being kept above the boiling point, so that the liquefied sap is vaporized, passes from the wood, and is drawn off by the vacuum pump.

After all the liquid has been drawn from the cylinder and the wood is perfectly dry, the oil is admitted. When the cylinder is full of oil a force pump is applied, and the pressure on the oil is raised to about 125 pounds per square inch and kept at that pressure until the gauges show that the proper amount of oil has been forced into the timber. This completes the treatment, and the timber is taken out of the cylinder. It takes from 24 to 36 hours to complete the process of impregnation.



Section of Untreated Pile After Exposure to the Ravages of the Dreaded Teredo Worm for Three Years

The illustration shows the ruin wrought in an untreated pile by the destructive teredo worm. The pile was taken from the mouth of the Pascagoula river after three years in the water. Some of the holes in the section were nearly an inch in diameter. A pile that had been treated with the creosoting oil and had been submerged for 30 years, which was taken up in Muscogee wharf, Pensacola, Fla., the worst teredo water in the Gulf of Mexico, bore not a blemish from the worm's ravages and showed not a sign of decay.

PANAMA CANAL NOW UNCLE SAM'S.

Government Takes Possession of Work Under Rights Granted Canal Company.

While nominally the title to the Panama Canal property will rest in the Panama Canal Company until the Colombian government ratifies the treaty, the United States is actually in possession. This announcement followed a recent conference between representatives of the Canal Company and Secretary Hay. The United States is now engaged in digging the canal under concessions granted the Canal Company by the government of Colombia. It is believed that under the arrangement with the Canal Company, the United States, if necessary, will be justified in going ahead with the construction of the canal even though Colombia should withhold her consent.

At present there are employed on the canal construction 1,500 laborers and foremen, 45 physicians and 160 civil engineers. They were employed by the Canal Company but are being paid by the United States. The daily expense of the construction amounts to about $5,000.

There is a trout about twenty-seven years old in Pennsylvania state hatchery.

Popular Mechanics

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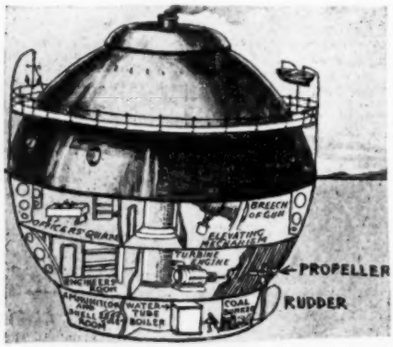
BATTERY WOULD DEFY THE WORLD.

Says New York Would Be Impregnable With This Equipment

Anson Phelps Stokes, millionaire philanthropist, has invented a floating battery for coast defense, which he claims would make New York harbor impregnable against the combined navies of the world. The battery could be used in offensive as well as defensive operations. It is of globular shape. The inventor says this form gives greater strength and safety and greater capacity for the same weight of construction. The battery has no propelling power except for purpose of directing the fire. The guns are rigid and are attached to the vessel itself.



Floating Battery

WATERPROOFING.

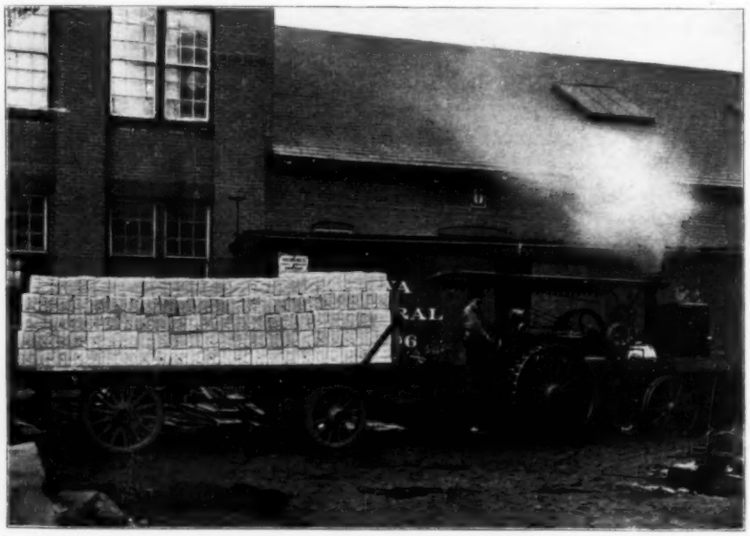
According to a patent secured by two French inventors, fabrics, yarns, garments, felts, feathers, etc., are waterproofed by soaking in a solution of soap, alum, sodium carbonate, paraffin and benzine, in a specified manner and in certain specified proportions, and drying at a temperature of 90 degrees C.; in some cases the soap may be dispensed with.

Traction Engine for City Haulage

A New Rival of the Automobile and Another Opponent of the Horse

The traction engine is beginning to make its way into the city for hauling heavy loads of freight. In this capacity it is the latest rival of the auto truck and another force aimed at the annihilation of the horse. The illustration shows a 14-horse-power Robinson engine hauling a load of paper at West Carrollton, Ohio.

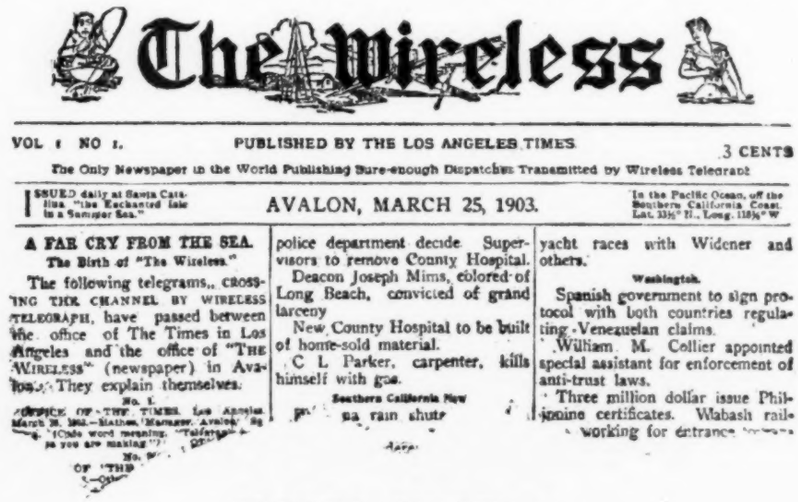
The Thresher World says: "The engine is used by the Geo. H. Friend Paper Co., at West Carrollton, for teaming purposes. The paper in the load weighs 24,780 pounds."



14 H. P. Engine Carrying 24,780 Pounds of Paper at West Carrollton, Ohio

THE DAILY WIRELESS.

The first daily newspaper in the world to be served exclusively by wireless telegraph is published at Avalon, on Catalina Island, 25 miles out in the Pacific from the California coast. The news is furnished by the Los Angeles Times. Heretofore there has been no communication with the main land except by boats and carrier pigeons. A heavy storm prevailed the first day of the service but had no effect upon the successful transmission of the dispatches.



The Wireless

VOL. 1 NO. 1. PUBLISHED BY THE LOS ANGELES TIMES. 3 CENTS

The Only Newspaper in the World Publishing Bona-enough Dispatches Transmitted by Wireless Telegraph

ISSUED daily at Santa Catalina, "the Enchanted Isle in a Sunspot Sea." AVALON, MARCH 25, 1903. In the Pacific Ocean, off the Southern California Coast. Lat. 33½° N., Long. 118¼° W.

A FAR CRY FROM THE SEA.

The Birth of "The Wireless."

The following telegrams, CROSSING THE CHANNEL BY WIRELESS TELEGRAPH, have passed between the office of The Times in Los Angeles and the office of "THE WIRELESS" (newspaper) in Avalon. They explain themselves.

No. 1.

OFFICE OF THE TIMES, Los Angeles, March 23, 1903.—Mathon, Manager, Avalon: Is (Code word meaning, "Telegram") as you are making it?

No. 2.

OFFICE OF THE TIMES, Los Angeles, March 23, 1903.—Mathon, Manager, Avalon: Is (Code word meaning, "Telegram") as you are making it?

police department decide. Supervisors to remove County Hospital.

Deacon Joseph Mims, colored of Long Beach, convicted of grand larceny.

New County Hospital to be built of home-sold material.

C. L. Parker, carpenter, kills himself with gas.

Southern California New ... rain shut ...

yacht races with Widener and others.

Washington.

Spanish government to sign protocol with both countries regulating Venezuelan claims.

William M. Collier appointed special assistant for enforcement of anti-trust laws.

Three million dollar issue Philippine certificates. Wabash railroad working for entrance ...

The First Wireless Telegraph Newspaper

GOULD'S NEW TURBINE YACHT.

George Gould's new turbine yacht, Emerald, chartered from Sir Christopher Furness has just arrived in New York from England. The Emerald is the first vessel fitted with turbine machinery that ever attempted to cross the Atlantic. Her dimensions are: Length over all, 236 feet; beam, 26 feet 8 inches; molded depth, 18 feet 6 inches. She has three sets of steam turbines, each driving one length of shafting, and five manganese bronze propellers—one propeller on the center shaft and two each on the side shafts.

Indian Nation in New York State

Home of the Once Powerful and Dreaded Onondagas About to be Invaded by the Trolley Car

You need not go to the Indian territory or other parts of the wild west to find Indians. A nation of Indians even at this day may be found in the very heart of the state of New York, the most populous and wealthy state of the Union. It is the nation of the Onondagas, once a power courted and dreaded by the white man. The great and wise Hiawatha of whom Longfellow sang in verse immortal, lived in the legends of the Onondagas. Still wearing their feathers and blankets; performing the green corn dance; burning the white dog and going through other ceremonies of their fathers, the Onondagas now live almost in the shadows of the city of Syracuse, New York. Once they enjoyed wild freedom untrammeled by the influence of civilization and their nation became one of the most formidable powers east of the Mississippi. But now their numbers have been reduced to scarcely 500 inhabitants and the trolley car is about to penetrate their picturesque seclusion. The Onondagas were the most advanced of the ancient eastern Indian tribes. They built comfortable log houses in the early days and their homes were superior to those of many of the early white settlers. Some of these log cabins yet remain, but that is about all the visitor can now see to tell of their former greatness. Originally the reservation embraced every foot of ground on which the city of Syracuse now stands, but it has been reduced by treaties to a small village of a few wigwams and ancient and picturesque log cabins.

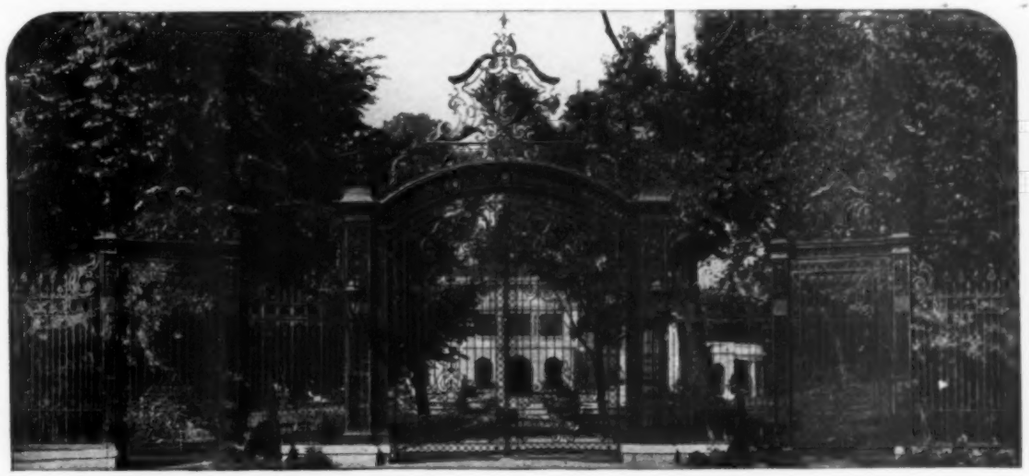
The Four Track News says: "Already the trolley reaches almost to the reservation gate and the time is not far off when the clang of the motorman's warning will echo through their wigwams and cars will whirl past the little cemetery where sleeps old Aunt Dinah with her 109 years, and old Capt. George, the great chief. And emerging from the reservation the trolley car will soon be tearing by the grave where slept the Cardiff giant.

Onondaga Cabin in the Indian Reservation.—From The Four Track News

Old Southern Gates Now the Vogue

Stately Entrances to the Suburban Homes of Exclusive Easterners

Fenceless suburban homes are losing the esteem they once enjoyed, and the old-time high fence, such as the Southern homesteads have never seen fit to discard, is coming into vogue again. The beautiful and artistic adornment the gates admit of, lends a princely air to the home and its environments. The old Southern custom of having bell knobs on the gates is also being revived among the exclusive Easterners. In olden days in the South a wire was attached to the gate knob, which when pulled rang a bell in the house, signifying a visitor sought admission. These stately gates with the antique bell system yet abound in the quaint city of New Orleans. Now the gates are equipped with electric bells, and when the button is touched the ponderous gates open, admitting the visitor into the yard, and a servant awaits him at the door. One of the most artistic of these gates that have recently been built in the East is the entrance to the residence of Wm. L. Elkins, Ogontz, Pa., shown in the accompanying illustration.



Entrance Gates to the Residence of Wm. L. Elkins, Ogontz, Pa.

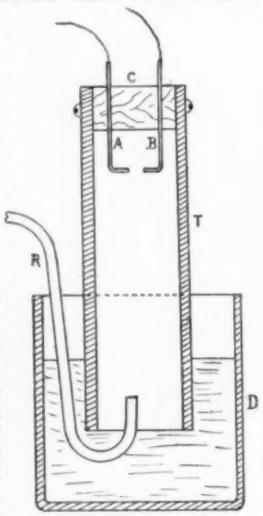
Comparative test in England of steam turbine and a Sulzer engine showed that below the three-quarter load the reciprocating engine showed up best in economy, at three-quarter load the two were equal, and above the turbine had the advantage.

Easy Electrical Experiments

By L. P. Dickinson

HOW TO MAKE AN ELECTRIC BOMB.

When a mixture of an inflammable gas is ignited there results a violent explosion. This is made use of in the gas engine, so common at the present time. There must always be both air and gas present in the mixture, or there will be no explosion, on the same principle that a fire will not burn unless it can have air. Moreover, it is found that there must be a definite relation between the amounts of air and gas, to secure the best results. It is found that with ordinary illuminating gas, the proper proportions are 7 parts of air to 1 part of the gas. A mixture differing slightly from the above will explode fairly well, but no great variation from the above proportions is possible.



The mixture may be exploded by contact with a flame, or better still, by passing through it an electric spark. Both of these methods have been made use of in the gas engine, although the use of the electric spark is fast superseding all other methods. The present chapter deals with the construction of a small electric bomb, which illustrates many important principles.

Take piece of ordinary iron pipe, 4 inches long and 1¼ inch in outside diameter. Turn the ends off smooth and true, and fit to one end an ordinary wooden plug, about ¾ inch thick. This plug should fit tightly, and should be turned out in a lathe, and it is well also to turn out the inside of the pipe where the plug is to fit in, in order to ensure a perfect fit.

Through the plug insert two short pieces of stiff brass wire, about two inches in length, bending the inside ends of these pieces toward each other, so that there is about ¼ inch clear space between them. Then insert the plug in place, first brushing it over with a layer of shellac, and fasten it in place by means of screws passing through the pipe and into the plug.

The bomb is now ready for filling with the explosive mixture. The surest way of doing this is indicated in the accompanying figure. Fill the pipe with water, and holding a piece of paper or the palm of the hand over its mouth, invert it in a dish of water, the mouth being submerged. Then remove the piece of paper, and if the plug at the top fits tightly, the bomb will remain filled with water, even though inverted. Attach a rubber tube to a gas jet, and place the open end of the tube in the water, and directly in the mouth of the inverted pipe.

Upon turning on the gas, bubbles of gas will rise through the water, the level of the latter will fall in the tube, and of course the outer containing dish will fill up. These operations cannot be seen through the pipe, and it may be well to take an ordinary horse-radish bottle, and experiment with that, just to see what takes place.

When the pipe is ¼ full of gas, the latter should be turned off, and air forced into the pipe. The experimenter can tell how full the pipe is, by observing the rise in level in the water in the outer dish. A preliminary trial will enable the experimenter to tell just how much the level must rise in order to fill the pipe to any given height.

When forcing in air, use a bicycle pump, as the use of the lungs will force in a lot of carbonic acid gas, which will hinder combustion.

Having filled the bomb, hold it with its mouth still under water, and insert a rather tight fitting cork. It may then be removed from the water, but if the cork does not fit tightly, it must still be kept bottom side up.

If the two wires A and B are connected with the terminals of an induction coil capable of giving a ¼ inch spark, the passage of the spark will ignite the mixture, producing a violent explosion. The experiment can be varied by using powder instead of gas, but of course the explosion of a bomb of this size filled with powder would be exceedingly dangerous.

The two terminals, A and B could be connected by a piece of very fine wire, so small that it would be heated very hot by the passage of a current from a battery. In this case no induction coil would be needed, but considerably more labor is involved, as the wire will have to be replaced each time. Both of these methods are made use of in the construction of submarine mines in time of war.

MARVELOUS MEXICAN MACKINTOSH.

There are mackintoshes and mackintoshes, but probably the queerest mackintoshes to be found in the world are those worn by the Mexicans. They are made of palmetto leaves

The Mexican Mackintosh

with the points extending downward, as shown in the illustration. Their construction is on the principle of the thatched roof, and it is said they will protect the wearer from rain better than the best rubber coat worn by the American. They are light, easily thrown about the form, and at night the Mexican can sleep under them in the hardest rain storm as secure from the elements as a person in a house.

QUARTZ-GLASS HIGHLY PRIZED.

New German Industry May Do Away With Ordinary Glass for Many Uses

By Richard Guenther, United States Consul General at Frankfort

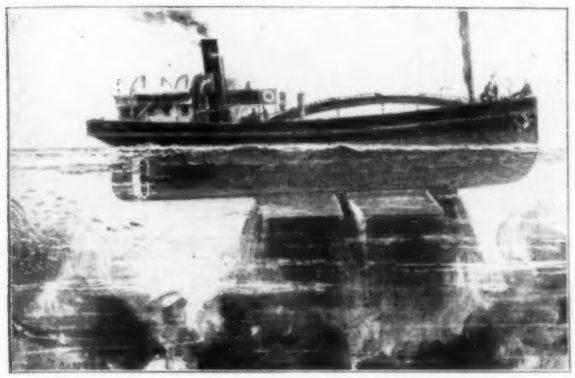
The manufacture of quartz glass is rapidly developing in Germany. The product consists essentially of melted quartz, which is made into tubes and other articles. It is perfectly translucent. The initial experiments in the manufacture of the new glass were made in England, but a firm at Hanau, a few miles from Frankfort, was the first to place quartz-glass apparatus upon the market.

The manufacture of quartz glass is yet in its infancy, but has already shown symptoms of vigorous growth. While two years ago England led in its production, she has since been relegated to second place by Germany. Everybody who knows the properties of quartz glass admits that it will soon replace ordinary glass for many uses. It is only a comparatively short time since German manufacturers revolutionized the manufacture of optical glasses and obtained a monopoly of this important industry, and there is reason to believe that this will be repeated with quartz glass.

If quartz glass can be produced at a moderate price—and this seems to be quite possible where electric force can be cheaply obtained from water power—it will no doubt be largely employed, especially in the chemical and electrical industries.

ONE CAUSE OF WATER POLLUTION IN LONDON AND CHICAGO.

In the Thames of London and in Lake Michigan near Chicago thousands of tons of sludge are dumped into the water annually— a practice that probably does more toward the pollution of the water supplies of the two cities than the causes usually ascribed. On being discharged,



Showing Method of Dredging Sludge in the Thames River near London and in Lake Michigan near Chicago

clouds of pollution spread in all directions through the water. The accompanying illustration shows one of the sludge-hoppers used on the Thames. The mud scow performs the same work in the Chicago waters. Trains of the scows loaded with the mud and refuse are towed out into the lake and emptied into the water that Chicagoans drink. Both the mud scow and the sludge-hopper have movable bottoms which are lowered or raised with chains.

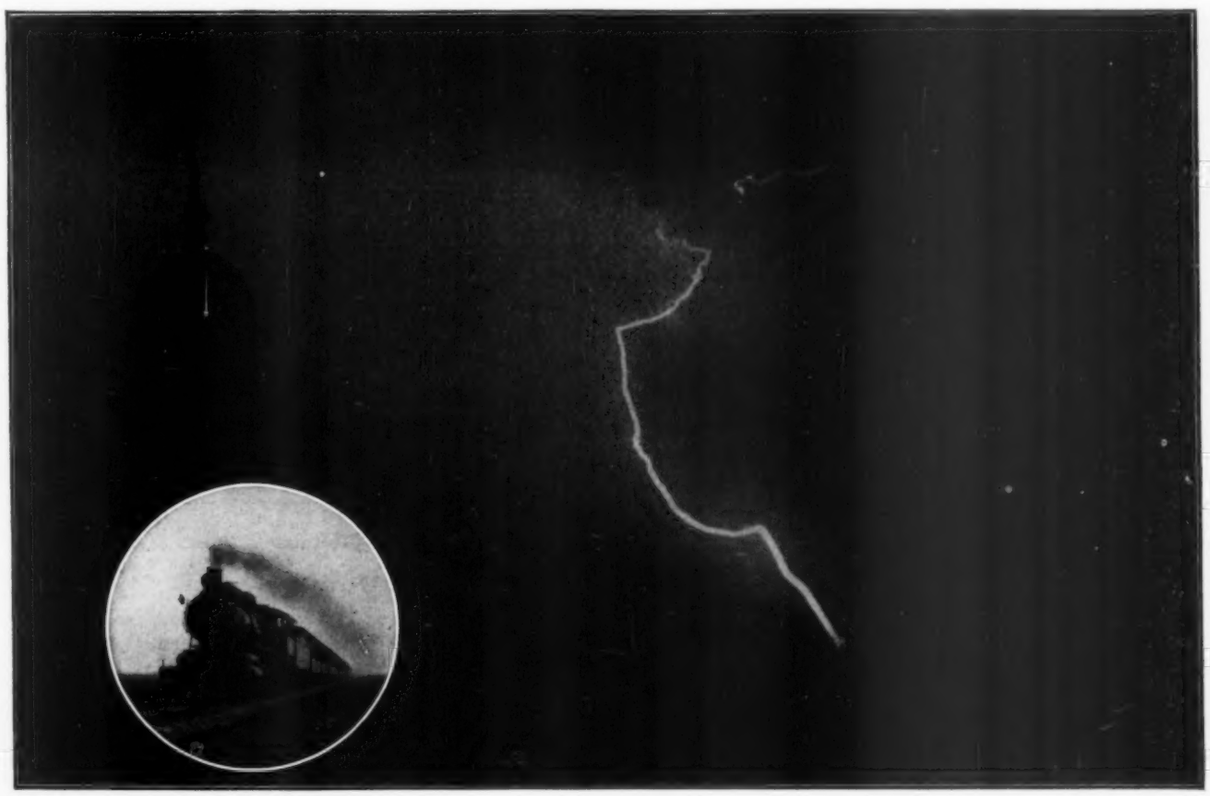
PRODUCES SLEEP BY ELECTRICITY.

One Can Take a Nap Whenever He Desires by Turning on the Current—No More Use for Opiates

Producing sleep by means of electricity is the latest in anaesthetics. All a person has to do now, according to the discoverer of the process, is to turn on the current in the proper manner and he goes to sleep. On breaking the current he awakes immediately and feels as refreshed as if he had gone to sleep by the ordinary method. It is said to do away with all the ill effects of taking opiates and to presage a brighter day for those who suffer from insomnia.

A Parisian, S. Leduc, has pursued his researches on the anaesthetic use of an electric current and extended them to the human subject, having the necessary experiments performed upon himself. The voltage was 50 at a maximum, and the current was introduced through cotton electrodes moistened with salt solution and placed, one on the forehead and another over the kidneys. The potential is reached gradually in the course of five minutes. The faculty of speech is first lost, and then the rest of the motor system. There is a gradual loss of sensation, beginning with a numbing of the limbs. The only disagreeable sensation is the gradual loss of the faculties, which gives the sensation of a nightmare. The heart is entirely unaffected, but the breathing is somewhat obstructed, probably, the author thinks, by the strength of the current through the neck, which should be shunted. On breaking the current the awakening is instantaneous, and the feeling is one of invigoration. All danger to life may be avoided by switching off the current as soon as the breathing shows a sign of stopping.

The Rock Island and Pacific has acquired a half interest in the Houston & Texas Central railroad and therefore will not build its proposed line from Dallas to the Gulf of Mexico.



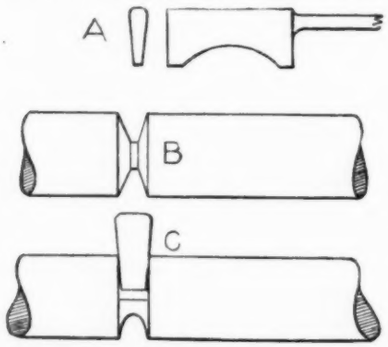
TWO REMARKABLE SNAPSHOTS are shown in the accompanying illustration—a train going at 90 miles an hour and a flash of lightning taken during a thunderstorm in the far north. The latter picture, which was taken by William J. Topley, a young Canadian photographer, residing in Ottawa is probably the most beautiful photograph of lightning ever obtained. With the blackness of the stormy night as a background, relieved by the dim silhouettes of the city's spires and steeples, the streak of brilliant lightning reaching from the heavens to the earth, cuts through the center of the pictu·e diffusing a milky radiation about its path. The artist's fancy aided by brush and paint, has rarely portrayed a conception grander and more imposing than this picture nature painted on the pho ographer's dry plate.

The picture of the fastly moving train serves to show the contrast between a snapshot taken in broad daylight and the strange, weird effects in the picture produced by the lightning's flash

SHOP NOTES

A BAR CUTTING KINK.

The following is a method which I employ for cutting off round bars of steel that my shears will not take, say from three to eight inches says a writer in the American Blacksmith. Any one can cut off a shaft hot and secure a good, clean end, but when I wish both ends clean without any chipping, I proceed as follows: Lay the shaft in a swage on the hammer die. Using a hack or cutter, A, go entirely around. This will give a cut as shown at B, having cut the shaft all around in this way and half way off. If we continue this, we will leave a knob sticking to each end. However, we have what we may call a parting tool. This is formed the same as a hack, although it is very heavy and has a square edge, as indicated at C. The ends must nearly fill up the space left by the former tool. Drive this tool about one-half way through, turn the bar over and drive the piece out which remains, by turning the same hack upside down as the space will be greater by this process, and will allow the piece to be driven out. By this process you will make as good an end on one piece as the other.



A GOOD METHOD OF CUTTING OFF ROUND BARS OF STEEL.

This may be an old kink, but I have hired no less than fifty smiths in the past year, and not one of them knew how to cut off a shaft properly without spending about an hour dressing up his cut, after butchering it.

HOW TO MEND RUBBER ARTICLES.

To mend rubber shoes, bails, hose, tire, the "Deutsche Chemische Wockenschrifts" recommends the following process: The articles are first freed of adhering mud particles and thoroughly dried. Varnish, as for instance on rubber shoes, is removed by means of emery paper on a file, and the part thus treated is well rubbed over with benzine. The edges of the hole are then painted over with a solution of Para caoutchouc in benzine, a fitting strip of natural rubber is laid over it, and a solution consisting of four parts of benzine, three of carbon sulphide, and 0.180 parts of sulphur chloride is applied to the edges by means of some cotton wool tied to a wooden holder, this solution serving to vulcanize and to increase the resistance of the rubber. The joined parts have, of course, to be well pressed together.

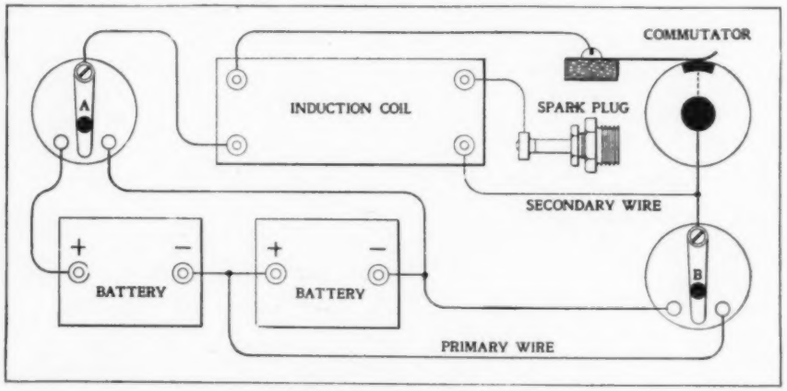
HINTS TO INVENTORS.

In the process of making paper from wood, now so universally used, the pulp is cooked in a steel tank called the digester. The Wisconsin Engineer says of this process: "The liquor and the chips are next brought together in the digester, where steam is turned on and gradually raised in pressure up to ninety pounds, though this process varies in different mills. Here the cook goes on for about eight hours when the spent liquor is drawn off and the pulp thoroughly washed to remove all traces possible of the acid. The result of this process is known as sulphite pulp.

"The digester, which is made of heavy steel and in dimensions frequently forty feet high by twenty in diameter, is the great problem for the engineer to solve. Here they must have a strong metal, with an acid resisting lining to prevent the sulphuric acid from attacking it. Lead one-half inch thick is often used, but since this expands with the heat in the ratio of 123 for iron or 297 for lead, there is a buckling of the lining, frequent breaks result and the digester is in constant danger of being destroyed. Acid resisting materials such as bronze are too expensive, so substitutes are looked for with great eagerness by pulp mill owners. They have tried many linings, such as cement, brick, and chemical coatings, all of which are more or less unsatisfactory. Here then is one of the problems for the future chemical engineer."

WIRING AN AUTO FOR TWO SETS OF BATTERIES.

The diagram from the Motor Age shows the two sets of batteries so arranged that by the use of the switch A, either set may be used or both cut out entirely. The switch B is normally on the right hand contact, but when desired to throw both sets of batteries into series, it is moved to the left hand contact, and the switch A used on the left hand contact.



Wiring for Two Sets of Batteries

In damp climates rubber belts outlast leather. It is impossible to hold the leather laps with glue or cement; the splices must all be rivited; even then the constant stretching is a great annoyance.

PAINT SHOP TRESTLES.

Two useful trestles for the painter are illustrated in the American Blacksmith, as specially adapted for work on shafts. Fig. 1, A, shows such a trestle, and the cut is self-explanatory. It can be made of such material, of such height and dimensions as to best suit the individual painter. The prongs which go down through the bolster and are fastened with a washer and nut, can be quickly made, at small cost, by the blacksmith. Fig. 1 B illustrates a gear trestle, and the way it is made is clearly understood from the cut. The upright arms for catching the axle arms will afford the smith another job in the making. Make the trestle wide enough to take the axle arms of the full width vehicle. And for ease of handling make it as light as possible, while at the same time giving it requisite strength.

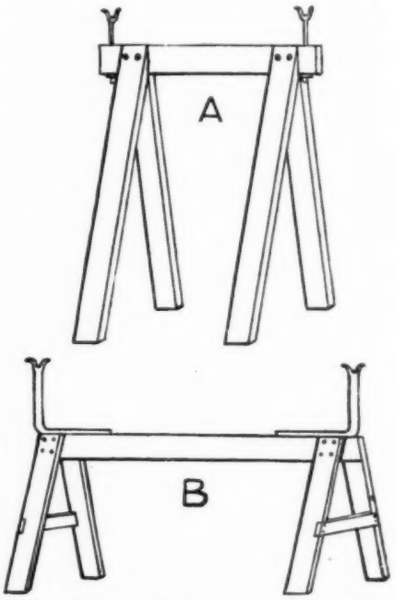


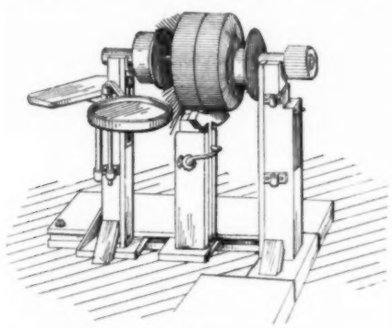
Fig. 1. TWO USEFUL TRESTLES FOR THE PAINTER.

Fuddy—"Funny that a carpenter should go to the barber's to have his hair shingled."

Duddy—"No funnier than that the barber should send his boy to the carpenter for shavings."

STAND FOR REPAIRING ARMATURES.

A convenient stand for repairing armatures of motors is described in the Street Railway Journal. The main supports for the armature comprise two pedestals, which may be adjusted to conform to the size of the motor. It will be noticed that provision is made on each of these uprights for placing a portable tool table and similar provision is made for supporting a seat for the workman while repairing the commutator. One of the supports is also furnished with dogs, which engage the pinion on the armature shaft when it is desired to hold the armature in one position. There is also a third upright between the main supports, which may be adjusted to any height. This carries a concave piece upon which may be supported one end of the armature when it is desired to raise it, so as to work on the commutator, for instance. Into this rest the armature fits, as the head is made to conform to the shape of the armature, and the weight is thus distributed so that it will not be thrown on one point alone. This reduces the danger of abrasion of the insulating material.



Stand for Repairing Armatures

TO DETERMINE THE POLARITY OF THE TERMINALS OF AN ELECTRICAL CIRCUIT.

Pole-finding paper of the ordinary type is not always handy when required, and it is well to know a convenient substitute. For this purpose common blue prints are admirably adapted. All that is necessary is to cut a slip from an old print, moisten it, and apply it to the terminals of which it is desired to ascertain the polarity. In a few seconds the blue paper in the neighborhood of the negative terminal will be bleached, the ferro-prussiate of potash being decomposed, with the liberation of potash at the negative. We have tried this suggestion, and find it to be perfectly successful.—L'Industrie Electrique.

PRESERVATIVE COMPOSITION.

A new German composition or paint, for protecting stone, wood, cement or the like from the effects of damp or other deleterious influences, consists of quicklime, chalk, mineral colors turpentine, boiled oil, galipot, rosin and benzine. The lime chalk, color and turps are first mixed and then made into a paste with the boiled oil. The paste is finely ground, and mixed with the rosins previously dissolved in the benzine.

RECEIPTS FOR LIQUID GLUE.

Take one quart of soft water and two pounds of the best pale glue, dissolve in a covered vessel by the heat of a water bath, cool, and add gradually, seven ounces of nitric acid (sp. gr. 1.335); when cold put it into bottles. It is very strong and does not gelatinize.

A liquid glue possessing great resisting power, recommended for wood and iron, is prepared as follows: clear gelatine, 100 parts; cabinet makers' glue, 100 parts; alcohol, 25 parts; alum, 2 parts. The whole is mixed with 200 parts of 20 per cent acetic acid and heated on a water bath for six hours.

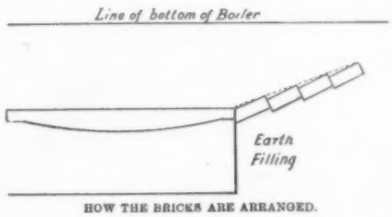
An improved liquid glue is made by dissolving 3 parts of glue, broken into small pieces, in 12 to 15 parts of saccharate of lime. On warming, the glue dissolves rapidly and remains liquid when cold without losing its strength. Any consistency desired may be obtained by varying the quantity of saccharate of lime.—American Blacksmith.

TREATMENT OF PYRITES.

A Norwegian invention relates to a process and furnace for treating sulphide ores so as to concentrate them, or, in certain cases, to obtain the metal, such as copper. The ore is treated in a furnace, preferably of the converter type, the heat developed by the combustion of the sulphur in a blast of air being sufficient to maintain the process after it has been once started. The furnace tapers downwards to the lowest part, where the tuyeres are situated. When the operation is completed, the slag is first drawn off, and then the metal or concentrated ore. The gases which are elvolved, containing oxides of sulphur, may be collected and utilized as by-products.

PLACING BRICK IN BRIDGEWALL.

A correspondent in the Wood-worker tells how to lay brick in a bridgewall so the brick will not be dislodged when the fuel used is sticks of wood. The cut shows the method clearly; the front end of the brick being below the back end of the row in front. The wood slides over instead of striking the edge of the brick.



HOW THE BRICKS ARE ARRANGED.

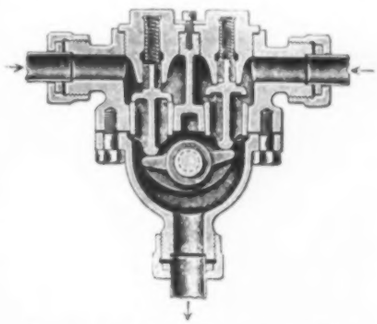
With an inch nozzle it would take 125 feet head of water to throw a stream of water 100 feet high. Under such pressure about 200 gallons per minute would be discharged.

Fearing exhaustion of the deposits, the Hungarian government has been petitioned to stop the exportation of native iron ore.

DRAWS WATER FROM CYLINDERS WHILE ENGINE IS IN MOTION.

By Ernest L. Harris, United States Commercial Agent at Eibenstock, Germany

A new German invention is an apparatus for the purpose of drawing condensed water from the cylinders of steam engines. The illustration which I enclose, shows the interior of the apparatus and how the water is drawn off while the engine is in action. The advantages of this invention are that the water is removed from the cylinders without any waste of steam and without the opening of valves and doors. As the apparatus works automatically it is not necessary for the engineer to keep watch of it. Its success in Germany has been marked.



German Device for Draining from Cylinders

ASBESTOS-COATED RUBBER.

A new English tubing consists of ordinary india rubber coated with an asbestos covering. For industrial purposes, laboratories, etc., where wear and tear are encountered, the asbestos is painted with green fireproof paint, which protects the coating from abrasion. In addition to preserving its pliability, the tubing retains in a measure its longitudinal elasticity, as the asbestos sheathing is plaited, and the strands allow a certain movement. Burners with rubber tubes of this sort may be placed on stoves and other heating apparatus. The pipes with metallic spirals were originally made with the same object, but they are hard and inclined to break, and once leaky they cannot be mended.

NICKEL STEEL RAILS.

It is reported that the Carnegie Company have orders for 9,000 tons of nickel steel rails, the bulk of which has been ordered by the Pennsylvania Railroad Company. The rails will contain 3½ per cent of nickel, and the same per cent of carbon as is now usual. Part of the order is for rails weighing 85 pounds per yard, and the rest is of 100-pound rails. The cost per ton is said to be double that of ordinary rails, but it is believed that they will last four times as long. The Pennsylvania company laid 300 tons of nickel steel rails in 1899, which were used on a heavy grade and curve near Altoona.

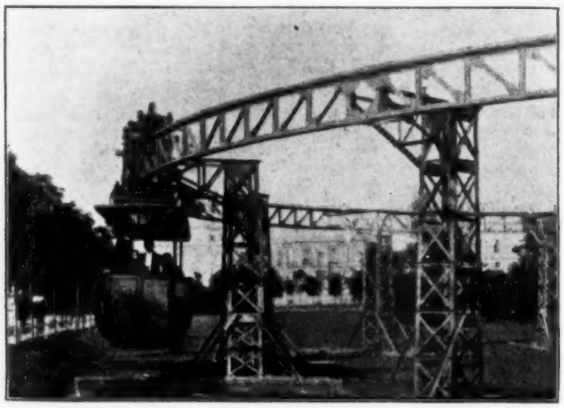
A new tria-aceptylised derivative of cellulose is obtained by treating cellulose with a mixture of acetio anhydride and sulphuric acid, with or without the addition of a suitable solvent, such as glacial acetic acid.

CZAR HAS A QUEER PRIVATE ELECTRIC RAILWAY.

It Conveys His Highness and Associates About the Palace Grounds and to the Railway Station

The Czar of Russia has his own private electric railway, and is the only ruler in the world boasting such a possession. It is a queer looking track with suspended cars, constantly in service, that tour the palace grounds and run to the railway station. The road has recently been put in operation and its success means an imperial order from his highness to the inventor to construct a line between St. Petersburg and Moscow, a distance of 345 miles.

The system is known as the Romanoff, and the inventor claims his ability to secure a speed of 150 miles an hour for



Romanoff Suspended Railway, Showing Car on 85-Foot Curve

parcels and mail. Electricity is the motive power, and the cars cannot jump the "track." Passengers are to ride at 100 miles per hour. Such a line would cost over $100,000 a mile. The Electric Review, London, says the steel structure weighs 400 tons per mile.

BRIDGE BATTLES WITH BLIGHTING BLASTS.

Pittsburg Span Built to Withstand Corrosive Fumes and Other Destructive Influences.

The great iron bridge of the Union Railroad that spans the Monongahela river at Pittsburg, Pa., is built to withstand corrosion and other influences that would assay its destruction. Subjected to heat from molten metal, sulphur fumes from locomotives, river steamers, furnaces and steel mills, there is probably no bridge in America so exposed to destructive agencies as this one. A heavy coating of Dixon's silica graphite paint is employed as a protection from the injurious blasts and fumes; and throughout the structure is built of the strongest and most durable material. The engineers have been exceedingly careful to guard against the weakening of the parts of the structure that are subjected to the greatest danger from exposure.

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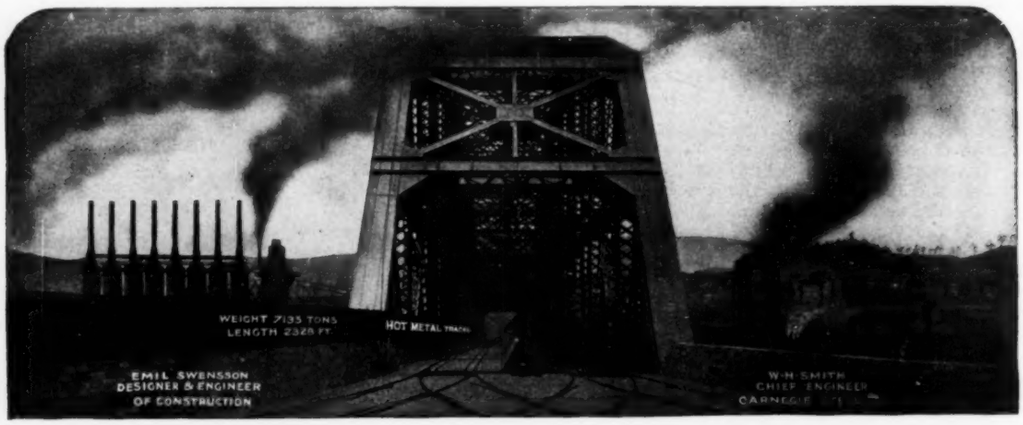
ACCIDENT ON IOWA AWAKENS NAVY.

Drill Regulations to Be Revised — No Way to Tell When a Gun Is Worn Out.

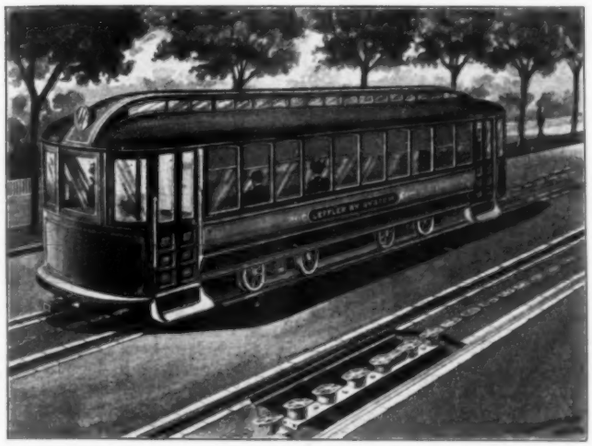
The bursting of the 12-inch rifle on the battleship Iowa, April 9, instantly killing three men and injuring five others, was due to a premature explosion of a shell and is of special significance, as it indicates that similar accidents with some of the older guns now in use are possible if not probable. Because of the succession of accidents which have occurred recently in the navy a board of officers is to be appointed to revise the drill regulations in order that every precaution may be taken against such casualties in the future.

This latest accident shows that there is no absolutely certain means of telling when a big gun has become so weakened by the heavy discharges that it is no longer perfectly safe to fire it. Before the war with Spain it was said by some that the life of a large gun was 100 shots. Ordnance department officials say that they have never made any such estimate and that a definite estimate is impossible. The gun that burst on the Iowa was one of the oldest in the service and had probably been fired oftener than any other. It was designed in 1893 and turned out of the naval gun factory in Washington in 1895. The forgings were supplied by the Bethlehem Steel Company. Up to Jan. 1 the gun had been fired 125 times. Since then it has probably been fired 15 times at least. A board of officers has been appointed to investigate the accident.

The accident, it is said, was caused entirely by a defective shell fuse which exploded fully 60 seconds before it was timed to go off.



Union Railroad Bridge, Crossing the Monongahela River, at Pittsburg, Pa.



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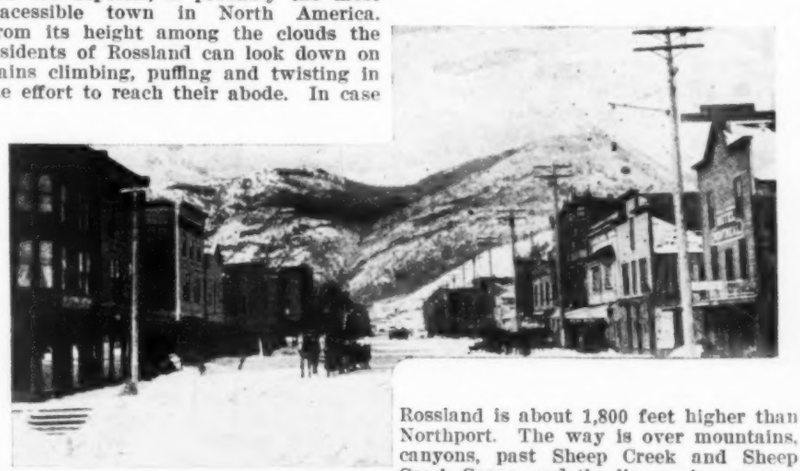
A TOWN IN THE CLOUDS.

Nestled away in the shades of mountain peaks, 5,000 feet higher than the sea, Rossland, B. C., which has lately attracted considerable notice because of its rich ore deposits, is probably the most inacessible town in North America. From its height among the clouds the residents of Rossland can look down on trains climbing, puffing and twisting in the effort to reach their abode. In case of a siege Rosslanders could station themselves in the surrounding mountain defiles and defend their town against the combined forces of the world. Once the city is reached, however, all the trouble-some climbing is over. It is built on a level and picturesque plateau, surrounded on every side by scenery of wild grandeur. It was a nerve wrecking engineering feat to build the railroad from Northport to Rossland, a distance of 17 miles.



Rossland is about 1,800 feet higher than Northport. The way is over mountains, canyons, past Sheep Creek and Sheep Creek Gorge, and the line makes a complete bowknot before it reaches Rossland. Two powerful Shay locomotives are used to transport ore from Rossland to Trail, where the smelters are located. They are the only two Shay locomotives on the Canadian Pacific.

Invents a Mechanical Lorenz

Machine to Cure Hip Dislocation Better than Famous Doctor

Ralph W. Bartlett, a Boston lawyer, has invented a mechanical appliance for treating congenital hip dislocation, that promises to surpass Dr. Lorenz' method of bloodless surgery. The appliance is said to have been tested in Boston hospitals and found to cure such cases even after they are past 10 years old, the age limit fixed by Dr. Lorenz. Mr. Bartlett's invention was promoted by fatherly love, for his own daughter was so afflicted. The machine is so constructed as to hold the bones while the necessary lengthening of the muscles, ligaments and tissues is gradually accomplished without the severe wrenching by the hand method. Only those parts are stretched which actually are holding the bone from its normal position.

NON-SHRINKABLE POROUS FABRICS.

Non-shrinkable and porous fabrics are produced by a German inventor by weaving threads composed of animal fiber with threads of vegetable fiber, then fulling the fabric thus produced to shrink the threads composed of animal fiber, and afterwards carbonizing to remove the threads composed of vegetable fiber.

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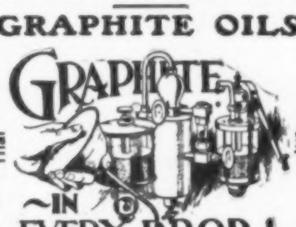

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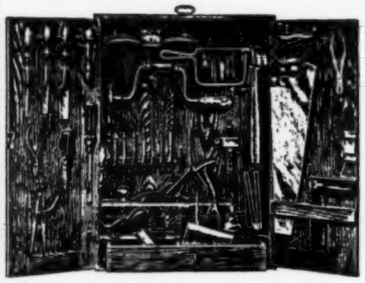

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With snow up to your knees,
To rush wet hose

Through the wint'ry snows
And a wind that makes you freeze:
To get the ladders in their place
After a wild old pell-mell race;
To ascend the same to reach the flame
'Mid the cries of the crowd uncouth;

To carry the pike aloft to strike
At the fiery, flaming roof,
To stand up there in the smoky air
In the midst of that fiery hell,

Midst a sizzle and drizzle that drives you wild,
As knowing you never can tell
When your feet may slip from their narrow grip
And you fall to the street below,
And lose your breath by being crushed to death
In a foot and a half of snow.
Or the bricks may fall,
And you find your pall
In some other trifling way;

While seeking cover
The smoke may smother
And then it's all "Good-day,"
While the clanging bell sounds the fireman's knell
As his life spark dies away.
Say!
The fireman's lot is a trifle hot
When you think of his handsome pay.

PERSIANS PREFER ART TO UTILITY.

Too Artistic to Have the Printing Press

In America there are a large number of people who oppose the building of sky scrapers because, they claim, they are inartistic. They do not like the automobile, either, or the elevated road or the trolley car for the same reason. They would have all the buildings low, as they used to be in the days of Ancient Greece, and the automobile, elevated cars and trolley cars, would be superseded by the ancient Grecian methods of conveyance. Prof. Triggs, of the University of Chicago, differs from these people. He says that the ancient Grecian architecture is no longer pretty, because it is no longer useful.

In America the sky-scraper of to-day, with its magnificent equipment of lights, hot and cold water, elevators, bells, telephones and countless other useful conveniences appeals to the great majority of the people—those termed the "inartistic"—as an imposing, magnificent structure.

In America these people who would tear down the sky-scrapers and substitute them with low Grecian-like structures are in the minority.

In Persia the adherents to these dead classics are in the majority. As the "artistic" American would do away with the sky-scraper because it offends his "artistic" eye, so the Persian will not have the printing press because, he says, in printed books the character of the letters is entirely lost. The type-made letter offends the Persian's "artistic" eye. Persia is today entirely dependent upon lithography for its own production of books and journals. At the beginning of the nineteenth century a press with movable types was set up in Tabritz, but had to be abandoned because the "artistic" Persians could not tolerate the unsightly printed letters. What mostly delights the Persian is a well-written manuscript, and he takes the same delight in the copyist's work that we take in the touch of the old master. Failing this, he contents himself with a lithograph, which is usually a facsimile of the writing of some fairly good scribe, and has at any rate a human element about it. Men of learning devote years to the acquirement of calligraphy and their best days to making artistic copies of classical works.

In Greece, when the style of building, since characterized as Grecian architecture, was first built there were people who did not like it because it was new and not classical. Maybe some day when it goes out of use the American style of architecture will be the ideal of these people of aesthetic tastes.

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Aeronauts Made Totally Deaf From Harrowing Experience in France

A balloon, the Aero Club No. 2, piloted by M. E. Meandri, a young French aeronaut, left the park of the Aero Club in Paris at 5 o'clock one evening recently, and after passing the night in the air, alighted at Arles in the south of France the next morning at 8 o'clock, having made 450 miles in 15 hours. The descent had been so rapid that the occupants of the basket lost their sense of feeling and it was found they were completely deaf. Bottles of vichy water, carried in the basket, were congealed.

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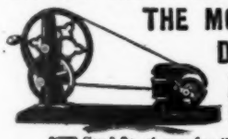

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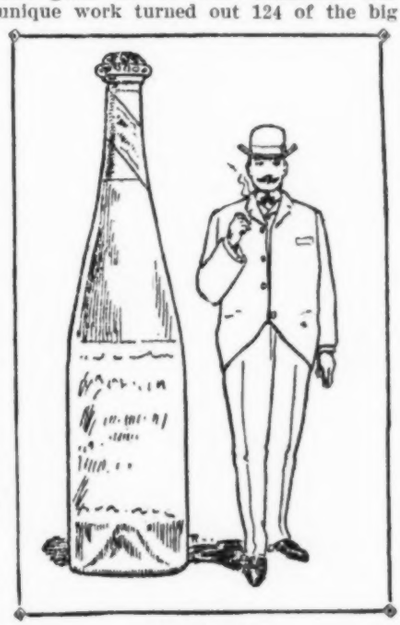

Largest Bottle

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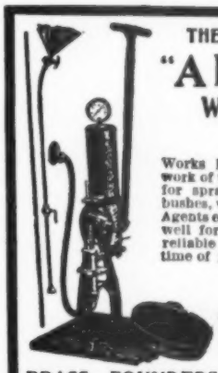
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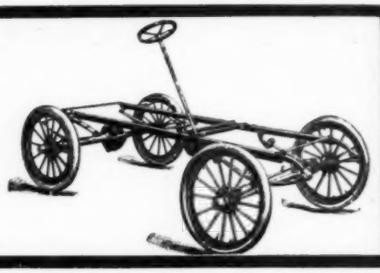

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